A.D. 1852. . . . . N° 749.

SPECIFICATION

OF

AUGUSTE EDOUARD LORADOUX BELLFORD.

APPARATUS FOR INHALING IODINE.

LONDON:
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1854.

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Apparatus for Inhaling Iodine.

PROVISIONAL SPECIFICATION left by Auguste Edouard Loradoux Bellford at the Office of the Commissioners of Patents, with his Petition, on the 15th November 1852.—A communication.

(*Void by reason of notice to proceed not having been given within the time prescribed by the Act.*)

I, Auguste Edouard Loradoux Bellford, of 16, Castle Street, Holborn, in the City of London, Patent Agent, do hereby declare the nature of the said Invention for "**Improvements in Apparatus for Inhaling Iodine**" to be as follows:—

a, *b*, *c*, *d*, *e*, Fig. 1, is a curved inhaling tube; the two extremities *a*, *e*, of this tube are open, and freely admit air into the interior of the apparatus. The part *e*, is made funnel shape, in order to apply the lips more conveniently to it; the object of the bulb is to retain the particles of solid iodine, which, if inhaled too strongly, would become detached and carried back into the throat, where the iodine ought only to come in the state of vapour. By means of the curve *d*, the apparatus could be fixed when not in use. Towards the centre of the lower bend *b*, a gauge pipe *f*, *i*, *b*, is soldered: this tube is intended to receive iodine previously moulded in small cylinders of a certain weight. The opening of the gauge tube is closed by an air-tight

stopper *f*. A scale is engraved on the glass of the tube, as seen in Fig. 1, bis. Each division of this scale corresponds to a precise quantity of iodine, (a centigramme, for instance). To effect this division on the tube is drawn the width of a cylinder of iodine, of homogeneous density, weighing a certain number of centigrammes. The space comprised is then subdivided into as many equal parts as there are units required, consequently each division represents a certain weight, according to the division effected. When the cylinders of iodine are arranged in the gauge tube *f*, *i*, *b*, whose opening is exactly closed by the stopper, if the lips be applied to *e*, and a suction made with the mouth, the air circulating through the inhaling tube turns into vapour the lower part of the small cylinder, which, undermined at its base, descends in proportion as new parts are subtracted from it. This evaporation of the iodine in the air is still more rapid if the lower part of the apparatus be warmed with the hand or otherwise. The scale traced upon the glass makes it convenient to measure at any moment the space occupied by the iodine, and thereby to ascertain the quantity absorbed. When it is required to introduce into the lungs or other organs air or other gases much charged with iodine vapour, the apparatus No. 2, is used; and, instead of being warmed with the hand or otherwise, the iodine is kept at the temperature of the circulating air; but care is taken to warm the air intended to convey it.

This inhaling apparatus is composed,

First, of the space D, whose capillary tube I, receives the iodine in small cylinders, which are made to move by means of a platinum piston J. This capillary tube bears a graduated scale, whose starting point is indicated at its upper part by a circular line. The middle part of this space receives a curved stem K, of glass or any other unalterable material, by which the vapour of iodine is exhausted. The opening of this space is closed by an-air tight tube N, M, terminating in a point at M, and funnel shaped at N. The point M, is intended to direct the air to the higher part of the iodine. The funnel or opening receives a stopper or cock *q*, to which is fitted a curved tube at right angles, *l*, *r*. The horizontal part of this tube

is covered with a metallic substance E, *f*, throughout the whole space submitted to the action of the flame, in order to preserve the glass and diffuse the temperature.

2nd, of a spirit lamp, which is composed, first, of the space A, which receives the spirit; second, with a cap G, air tight to prevent the evaporation of the liquid, when the apparatus is not to be used; third, of a glass wick holder G; fourth, laterally, is a metallic arm H, at the extremity of which is a collar S, disposed in such a manner as to maintain the inhaling apparatus in a convenient position; fifth, of a metallic stem B, which on one part supports all these pieces, and is screwed to a metal stand C′. By means of this disposition the air enters by the orifice *l*, and is raised to a high temperature in passing through the space E, *f*, and in this state it is charged with a greater quantity of iodine in the state of vapour.

The iodine is preserved in cylinders in small tubes Fig. 5, fixed by one end to the lamp and at the other by an air-tight stopper. To construct this flask tubes are used whose smallest diameter is such as to allow the cylinders to slide easily without shaking, which preserves them from injury. These tubes or flasks have another advantage, that of permitting the introduction of the iodine into the apparatus with the greatest facility, merely by opening each apparatus, and placing the orifice of the flask in such a manner that by a slight inclination the cylinder will slide into the space reserved for it.

These first two forms of apparatus which are described are intended in case one has at disposal iodine weighed and moulded by the process hereafter described. Figs. 3 & 4, represent apparatus by which, with common iodine, the quantity absorbed may be known by observing the decrease of the weight. This apparatus is represented the full size. It is composed principally of a small measure very susceptible, indicating immediately the quantity of iodine which it contains. The tapering extremity of the tube C, terminates by a small opening *o*, permitting only the passage of the rod *k*, to which is suspended, by the hook *m*, the basket *n*, which receives the iodine,

Bellford's Improvements in Apparatus for Inhaling Iodine.

At the upper part of the rod is a slender disc *h*, sustained by a spiral spring fixed to the stopper *d*. This disc may pass successively through the divisions of a scale traced on the tube, so that each degree shall represent a certain quantity of iodine deposited in the basket. This disc also serves to arrest the vapours which, instead of following the inhaling tube, may have entered the body of the measure and not have been absorbed by the tube *i*, which is made particularly susceptible to the action of the iodine, in order to absorb the fleeting vapours. The openings in the basket should be small enough to retain common iodine, and numerous enough to allow free passage to the air. In this apparatus the draught is made from below, and the section of the inhaling tube smaller than the total of space allowed by the holes in the basket, for the double purpose of preventing the obstructions of the holes and the rising even of the basket itself in case of a too strong inhalation being made.

If when breathing the vapours of iodine it be found inconvenient to work the measurer, the contrivance as in Fig. 4, may be used. A, represents the space in which is placed the basket, after having charged it with a certain quantity of iodine. When the iodine has been inhaled a certain time, to ascertain the quantity absorbed place the different parts of the iodinometer on the support P ; the stopper K, is taken out, and the basket drawn from the tube A′, to hang it on the hook B′. By subtracting this new weight from the first weight, the difference indicates the quantity of iodine absorb'd. This is effected instantly, and with the greatest ease, by means of the small hooked spoon, represented in Fig. 6.

To cause iodine to penetrate into the system, it is sometimes necessary or more convenient to have it injected or insufflated instead of inhaled. For this the same means are employed, and the same apparatus ; only care must be taken to construct the branches of the apparatus serving for the emission and admission of the air in such manner that, if necessary, an adjusting vapour conducting pipe may be added on one of the sides, and on the other a reservoir of air or other gas (an india-rubber bottle, for instance). In such case, instead of warming the iodinometer by the hand, it is better

to use a bath of warm water, into which a part of the apparatus is to be plunged. To mould exactly the iodine, the handling of which is extremely difficult, the following process may be employed. The iodine made use of must be very pure, perfectly dry, and reduced to powder. The utensils and apparatus which co-operate in the moulding should be made of platinum, glass, or crystal, or any other solid substance which is not attacked by iodine. During the time of pulverization, of sifting and moulding, the operator should be sheltered from the vapours of the iodine, and the iodine should not be exposed to the action of damp air, nor to a very high temperature. The temperature which surrounds melting ice is very suitable for moulding iodine. The iodine should be pounded in a mortar made of porcelain, fixed in a glass covering, closed at its upper and lateral parts by a supple and impenetrable band which permits the handling of the pestle, with a sieve and a bottle hermetically corked, without giving access to the surrounding air. The transparent sides of the covering enable the operation to be carried on conveniently. Before commencing pulverization, for greater safety take the precaution of surrounding the mortar with chloride of calcium, or any other drying substance. When the iodine is pulverized fill the flask and cork it immediately. The apparatus for moulding the iodine is composed of a transparent vessel easily opened and closed; this vessel communicates with numerous holes made in a piece of platinum. At the lower part these holes are closed with a platinum rod, which can be fixed or moved at will, and which acts as a breech. At the upper part these holes receive another rod, acting as a piston, which serves to compress the matter, and causes it to be emitted when it is moulded, and the breech is again rendered moveable. Precaution is taken to calculate the section of the cylinders in order that the weights of the compressed iodine, by an equal force, may always be proportionate to the length. This gives the means of always having at disposal iodine ready weighed and of various and determinate weights. When the iodine is placed in the moulding apparatus, by inclining it suitably (with the assistance of slight shaking) the holes are filled; in inclining in a contrary

manner the excess of iodine is thrown out. Lower the compressing pistons, and finish by pressing the cylinders into the flasks by which they are preserved.

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BELLFORD'S Provisional Specification.

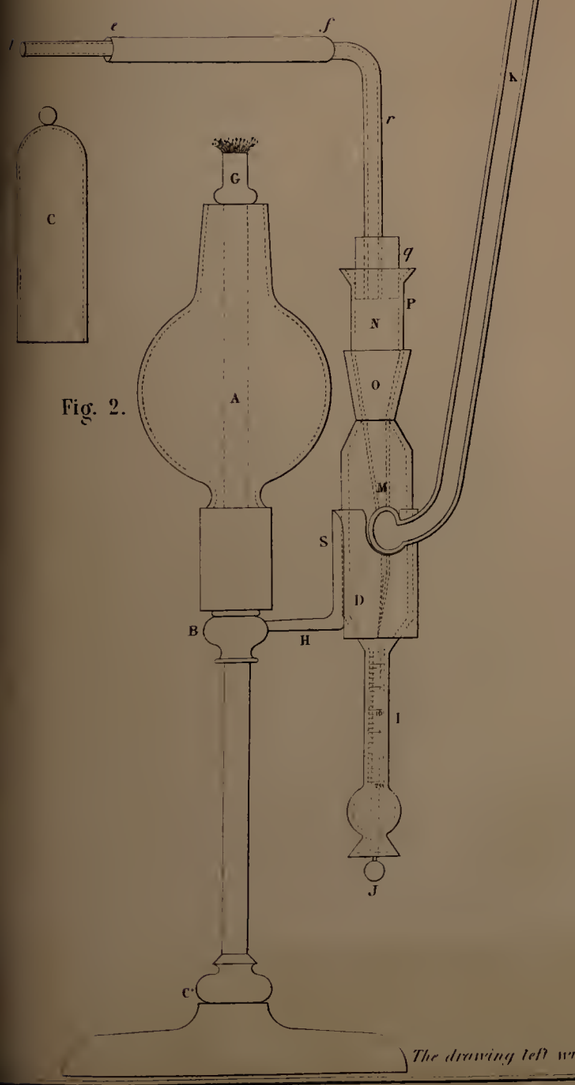

Fig. 2.

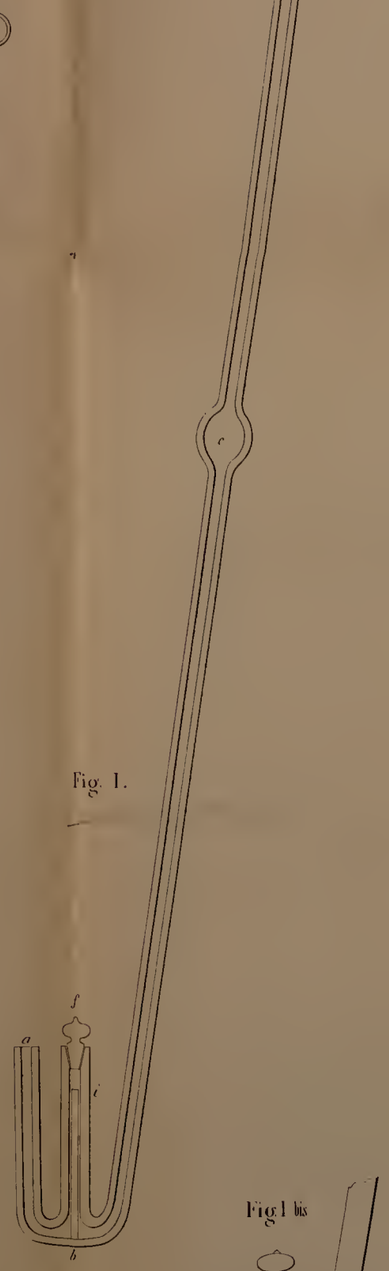

Fig. 1.

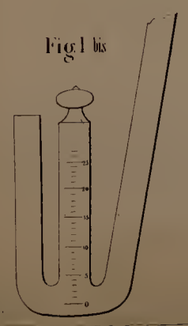

Fig 1 bis

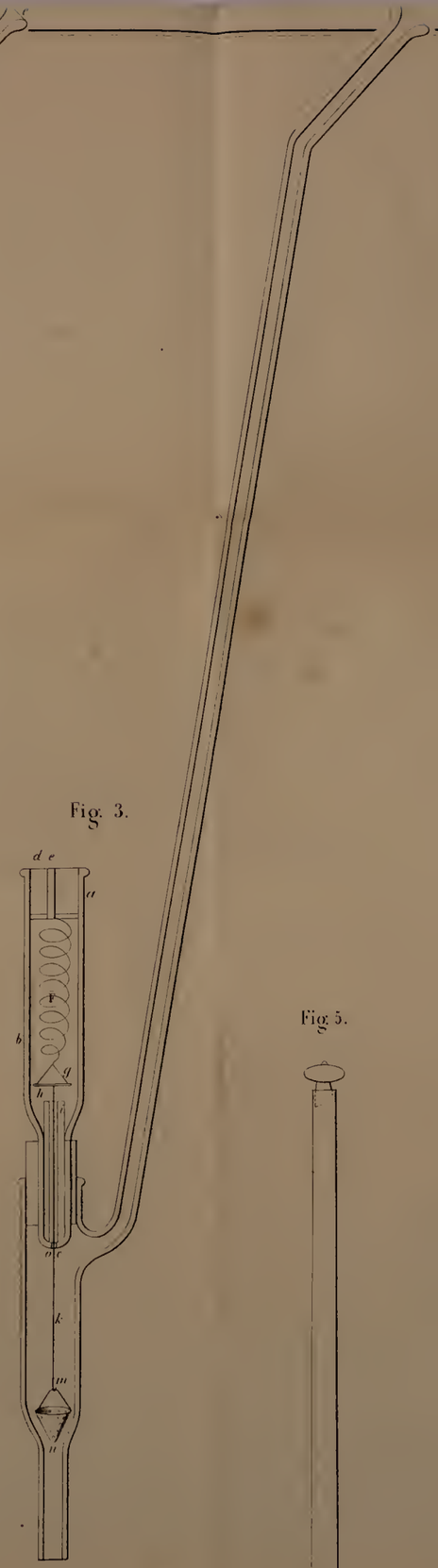

Fig. 3.

Fig. 5.

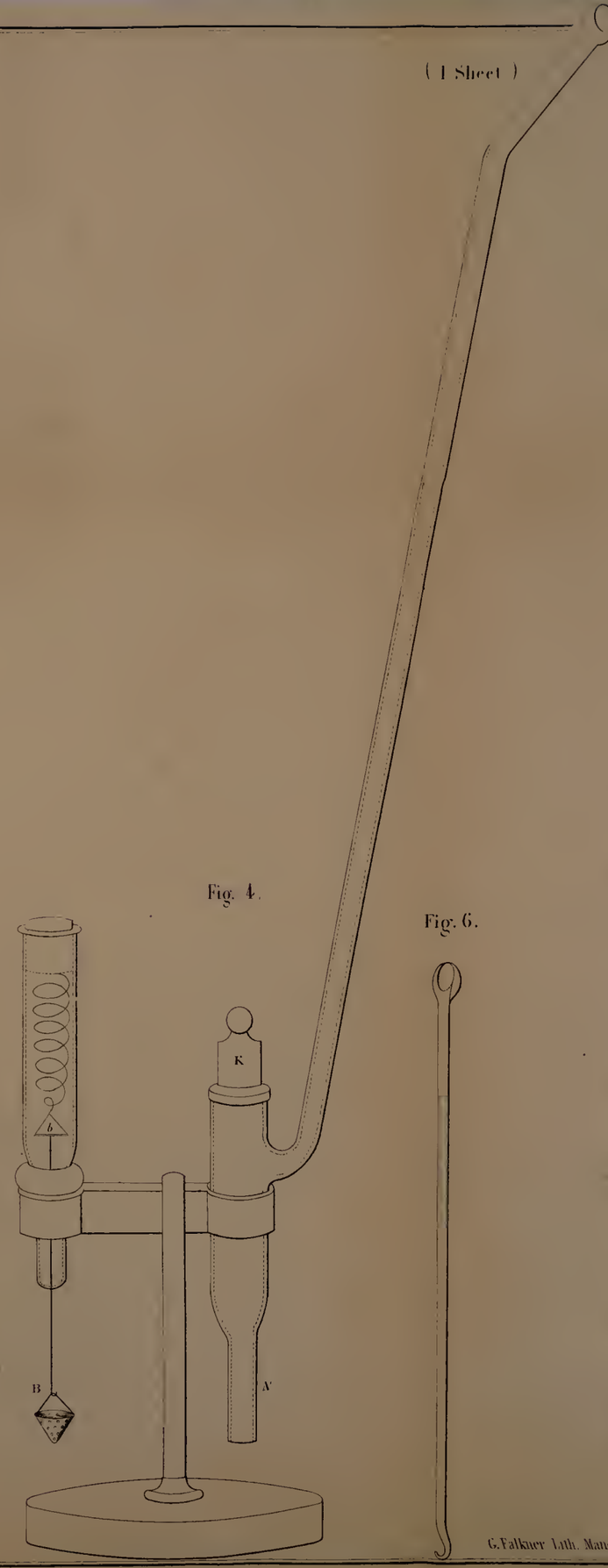

Fig. 4.

Fig. 6.

The drawing left with Provisional Specification is not colored.

G. Falkner Lith. Manch^r

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